AMENDMENTS TO THE CLAIMS:

The following Listing of Claims replaces all prior Listings, and versions, of claims in the above-identified application.

Listing of Claims

1-114. (Cancelled)

115. (Previously Presented) An isolated nucleic acid molecule comprising a nucleic acid sequence encoding an amino acid sequence that is at least 95% identical to SEQ ID NO:66, wherein the amino acid sequence has β-hydroxyacyl-ACP dehydrase (DH) activity.

116. (Previously Presented) The isolated nucleic acid molecule of Claim 115, wherein the nucleic sequence encodes an amino acid sequence that is at least 97% identical to SEQ ID NO:66.

117. (Previously Presented) The isolated nucleic acid molecule of Claim 115, wherein the nucleic sequence encodes an amino acid sequence that is at least 99% identical to SEQ ID NO:66.

118. (Previously Presented) The isolated nucleic acid molecule of Claim 115, wherein the nucleic sequence encodes an amino acid sequence of SEQ ID NO:66.

119. (Previously Presented) The isolated nucleic acid molecule of Claim 115, wherein the nucleic acid molecule consists of a nucleic acid sequence encoding SEQ ID NO:66.

120. (Previously Presented) The isolated nucleic acid molecule of Claim 115, wherein the nucleic acid sequence is SEQ ID NO:65.

121. (Previously Presented) The isolated nucleic acid molecule of Claim 115, wherein the nucleic acid molecule comprises a nucleic acid sequence encoding SEQ ID NO:62.

122. (Previously Presented) The isolated nucleic acid molecule of Claim 115, wherein the nucleic acid molecule comprises the nucleic acid sequence of SEQ ID NO:61.

123. (Previously Presented) A recombinant nucleic acid molecule comprising the nucleic acid molecule of Claim 115 and an expression control sequence.

124. (Previously Presented) A recombinant nucleic acid molecule comprising the nucleic acid molecule of Claim 118 and an expression control sequence.

125. (Previously Presented) A recombinant nucleic acid molecule comprising the nucleic acid molecule of Claim 120 and an expression control sequence.

126. (Previously Presented) A recombinant microbial or plant cell that expresses the recombinant nucleic acid molecule of Claim 123.

127. (Previously Presented) The recombinant cell of Claim 126, wherein the recombinant cell is a plant cell.

128. (Previously Presented) The recombinant cell of Claim 126, wherein the recombinant cell is a microbial cell.

129. (Previously Presented) The recombinant cell of Claim 130, wherein the microbial cell is from a Thraustochytrid.

130. (Previously Presented) The recombinant cell of Claim 131, wherein the Thraustochytrid is a *Schizochytrium*.

131. (Previously Presented) A recombinant microbial or plant cell that expresses the recombinant nucleic acid molecule of Claim 124.

132. (Previously Presented) The recombinant cell of Claim 131, wherein the recombinant cell is a plant cell.

133. (Previously Presented) The recombinant cell of Claim 131, wherein the recombinant cell is a microbial cell.

134. (Previously Presented) The recombinant cell of Claim 133, wherein the microbial cell is from a Thraustochytrid.

135. (Previously Presented) The recombinant cell of Claim 134, wherein the Thraustochytrid is a *Schizochytrium*.

136. (Previously Presented) A recombinant microbial or plant cell that expresses the recombinant nucleic acid molecule of Claim 125.

137. (Previously Presented) The recombinant cell of Claim 136, wherein the recombinant cell is a plant cell.

138. (Previously Presented) The recombinant cell of Claim 136, wherein the recombinant cell is a microbial cell.

139. (Previously Presented) The recombinant cell of Claim 138, wherein the recombinant cell is a Thraustochytrid microorganism.

140. (Previously Presented) The recombinant cell of Claim 139, wherein the

recombinant cell is a *Schizochytrium*.

141. (Previously Presented) A method to produce at least one polyunsaturated fatty acid (PUFA), comprising culturing under conditions effective to produce the PUFA, a microorganism or a plant that expresses a PKS system for production of PUFAs, wherein the microorganism or plant expresses the recombinant nucleic acid molecule of Claim 123.

142. (Currently Amended) The method of Claim 141, wherein the microorganism or plant produces a polyunsaturated fatty acid (PUFA) profile that differs from ~~an organism~~ a microorganism or plant that does not express the recombinant nucleic acid molecule.

143. (Currently Amended) The method of Claim 142, wherein the ~~organism~~ microorganism or plant produces docosahexaenoic acid (DHA), and wherein the production of DHA is increased in the microorganism or plant as compared to ~~an organism~~ a microorganism or plant that does not express the recombinant nucleic acid molecule.

144. (Previously Presented) The method of Claim 141, wherein the microorganism or plant is a microorganism.

145. (Previously Presented) The method of Claim 141, wherein the microorganism or plant is a plant.

146. (Previously Presented) A method to produce at least one polyunsaturated fatty acid (PUFA), comprising culturing under conditions effective to produce the PUFA, a microorganism or a plant that expresses a PKS system for production of PUFAs, wherein the microorganism or plant expresses the recombinant nucleic acid molecule of Claim 124.

147. (Previously Presented) The method of Claim 146, wherein the microorganism or plant is a microorganism.

148. (Previously Presented) The method of Claim 146, wherein the microorganism or plant is a plant.

149. (Previously Presented) A method to produce at least one polyunsaturated fatty acid (PUFA), comprising culturing under conditions effective to produce the PUFA, a microorganism or a plant that expresses a PKS system for production of PUFAs, wherein the microorganism or plant expresses the recombinant nucleic acid molecule of Claim 125.

150. (Previously Presented) The method of Claim 149, wherein the microorganism or plant is a microorganism.

151. (Previously Presented) The method of Claim 149, wherein the microorganism or

plant is a plant.

152. (Previously Presented) A method to produce a genetically modified plant that has a polyunsaturated fatty acid (PUFA) profile that differs from the plant in the absence of the genetic modification, comprising genetically modifying cells of the plant to express a PKS system for production of PUFAs comprising the recombinant nucleic acid molecule of Claim 123.

153. (Previously Presented) A method to produce a genetically modified plant that has a polyunsaturated fatty acid (PUFA) profile that differs from the plant in the absence of the genetic modification, comprising genetically modifying cells of the plant to express a PKS system for production of PUFAs comprising the recombinant nucleic acid molecule of Claim 124.

154. (Previously Presented) A method to produce a genetically modified plant that has a polyunsaturated fatty acid (PUFA) profile that differs from the plant in the absence of the genetic modification, comprising genetically modifying cells of the plant to express a PKS system for production of PUFAs comprising the recombinant nucleic acid molecule of Claim 125.

155. (Previously Presented A method to produce lipids enriched for docosahexaenoic acid (DHA), comprising culturing under conditions effective to produce the lipids, a Thraustochytrid microorganism that expresses the recombinant nucleic acid molecule of Claim 123 and that produces DHA, wherein the production of DHA is enriched in the Thraustochytrid microorganism as compared to in the absence of the expression of the recombinant nucleic acid molecule.

156. (Previously Presented) A method to produce lipids enriched for docosahexaenoic acid (DHA), comprising culturing under conditions effective to produce the lipids, a Thraustochytrid microorganism that expresses the recombinant nucleic acid molecule of Claim 124 and that produces DHA, wherein the production of DHA is enriched in the Thraustochytrid microorganism as compared to in the absence of the expression of the recombinant nucleic acid molecule.

157. (Previously Presented) A method to produce lipids enriched for docosahexaenoic acid (DHA), comprising culturing under conditions effective to produce the lipids, a Thraustochytrid microorganism that expresses the recombinant nucleic acid molecule of Claim

125 and that produces DHA, wherein the production of DHA is enriched in the Thraustochytrid microorganism as compared to in the absence of the expression of the recombinant nucleic acid molecule.

158. (Previously Presented) An isolated recombinant cell that expresses the recombinant nucleic acid molecule of Claim 123.

159. (Previously Presented) An isolated recombinant cell that expresses the recombinant nucleic acid molecule of Claim 124.

160. (Previously Presented) An isolated recombinant cell that expresses the recombinant nucleic acid molecule of Claim 125.